Claims:

1. A method for reducing visual artefacts in a frame of a digital video signal, which is coded by blocks and then decoded, a block type being defined according to the coding method for a block selected from a predetermined set of coding types, in which filtering is performed to reduce visual artefacts due to a block boundary, **characterized** in that the filtering performed on the block boundary depends on block types of the frame in the environment of the block boundary (30).

2. A method according to Claim 1, **characterised** in that the frame comprises at least one region of blocks, each block within said region having a region type, and that the filtering performed on the block boundary depends on a region type of the blocks in the environment of the block boundary (30).

3. A method according to Claim 1, **characterised** in that the filtering performed on the block boundary depends on a block type of a block on a first side of the block boundary (30) and on a block type of a block on a second side of the block boundary (30).

4. A method according to Claim 1, **characterised** in that at least one parameter of the filtering performed to reduce visual artefacts due to a block boundary on at least one side of the block boundary is modified according to the block type of at least one block in the environment of the block boundary (30).

5. A method according to Claim 4, **characterised** in that at least one parameter of the filtering performed to reduce visual artefacts due to a block boundary is modified according to the block type of a first block and a second block, the first and second block being located on opposite sides of the block boundary (30).

6. A method according to Claim 4, **characterised** in that said at least one parameter is selected from a group comprising: a number of pixels to be examined, a number of pixels to be filtered, an activity measure providing an indication of the difference between pixel values on one side of the block boundary, a filtering window.

7. A method according to Claim 1, in which a number of pixels (n) is selected for examination from at least one side of the block boundary (30), **characterized** in that the number of pixels (n) selected for examination depends on the image content of the frame in the environment of the block boundary (30), and that the number of pixels (n) selected for examination further depends on the block type of a block in the environment of the block boundary (30).

8. A method according to Claim 7, **characterised** in that the number of pixels (n) selected for examination depends on the difference in pixel value (Δ) between pixels across the block boundary.

9. A method according to Claim 7, **characterized** in that the number of pixels selected for examination depends on the size of the quantization step (QP) of the coefficients used in the coding of the blocks.

10. A method according to Claim 9, **characterized** in that the number of pixels (n) selected for examination is determined by the formula:

$$n = \begin{cases} 0 & \Delta \geq 2.00\alpha \\ 1 & 1.50\alpha \leq \Delta < 2.00\alpha \\ 2 & 1.00\alpha \leq \Delta < 1.50\alpha \\ 3 & 0.66\alpha \leq \Delta < 1.00\alpha \\ 4 & 0.40\alpha \leq \Delta < 0.66\alpha \\ 5 & 0.25\alpha \leq \Delta < 0.40\alpha \\ 6 & 0 \leq \Delta < 0.25\alpha \end{cases}, \qquad (2)$$

wherein Δ is the difference in value between pixels across the block boundary, α = QP·log(QP) and QP is the size of the quantization step of the coefficients used in the coding of the blocks.

11. A method according to Claim 8, **characterized** in that the number of pixels (n) is first defined according to the image content of the frame in the environment of the block boundary (30), and the number of pixels (n) is further truncated according to the block type of a block in the environment of the block boundary (30) to give a truncated number of pixels (n_{tr}) for examination.

12. A method according to Claim 11, **characterized** in that the truncated number of pixels (n_{tr}) is determined by selecting a truncation value (trval) according to the table

	Region type of the Block on the Second side							
Region type of the Block on the First side	INTRA		COPY		CODED		NOT_CODED	
INTRA	n	n	2	2	n	4	n	2
COPY	2	2	2	2	2	4	2	2
CODED	4	n	4	2	4	4	4	2
NOT_CODED	2	n	2	2	2	4	2	2

and using said selected truncation value (trval) with the formula

$$n_{tr} = \min(\text{trval}, n), \qquad (3).$$

13. A method according to Claim 1, **characterized** in that certain pixels to be filtered are selected, and a new value is determined for each pixel to be filtered on the basis of pixels that appear in a filtering window set around the pixel.

14. A method according to Claim 1, **characterized** in that pixels to be filtered are selected from the pixels selected for examination.

15. A method according to Claim 13, **characterized** in that the new value of the pixel to be filtered is the mean value of the pixels that appear in the filtering window.

16. A method according to Claim 13, **characterized** in that for determining a new value for the pixels to be filtered on the first side of the block boundary, said filtering window is used, and the size of the window is determined according to the table

d_r ($d_l > 1$)	r_1	r_2	r_3
1	X	X	X
2	1	X	X
3	1	1*	X
4	2	2	X
5	2	2	2**
6	3 or 2***	3	3

where

* the filtered value of pixel r_1 is used for filtering of pixel r_2

** the filtered values of pixels r_1 and r_2 are used for filtering pixel r_3

*** 3 if $d_l > 2$, otherwise 2,

wherein an integer parameter d_r indicates activity on the first side of the block boundary, and an integer parameter d_l indicates activity on the second side of the block boundary, r_1, r_2 and r_3 are the three pixels on the first side of the block boundary closest to the boundary in this order, X means that the pixel is not filtered, the number means that in addition to the pixel to be filtered, a quantity of pixels shown by the number are taken to the filtering window from both sides of the pixel to be filtered, and "3 or 2" means "3, if $d_l > 2$, otherwise 2", and for determining the new value of the pixels to be filtered on the other side of the block boundary, a filtering window defined similarly is used, with the exception that all r's are replaced by l's and vice versa.

17. A method according to Claim 16, **characterized** in that said activity is determined on the basis of changes in pixel values.

18. A method according to Claim 16, **characterized** in that

$d_r = 6$, if $|r_1 - r_j| \leq \beta/j$ with all $j \in [1,6]$,
otherwise: $d_r = i$, where i meets the conditions
$i \in [1, n_{tr}]$,
$|r_1 - r_{i+1}| > \beta/i$, and
$|r_1 - r_j| \leq \beta/j$ with all $j \in [1,i]$,

wherein the auxiliary parameter $\beta = 4 \cdot \log(QP)$ and QP is the size of the quantization step of the coefficients used in the coding of the blocks,

and the value of the parameter d_i is determined similarly, with the exception that all r's are replaced by l's.

19. A device for reducing visual artefacts in a frame of a digital video signal, which is coded by blocks and then decoded, a block type being defined according to the coding method for a block selected according to a predetermined set of coding types, the device comprising a filter for reducing visual artefacts due to a block boundary, **characterized** in that the filter is arranged to operate adaptively according to the block types of the frame in the environment of the block boundary (30).

20. A device according to Claim 19, **characterised** in that the filter is arranged such that the frame comprises at least one region of blocks, each block within said region having a region type, and that the filtering performed on the block boundary depends on a region type of the blocks in the environment of the block boundary (30).

21. A device according to Claim 19, **characterised** in that the filter is arranged such that the filtering performed on the block boundary depends on a block type of a block on a first side of the block boundary (30) and on a block type of a block on a second side of the block boundary (30).

22. A device according to Claim 19, **characterised** in that the filter is arranged such that at least one parameter of the filtering performed to reduce visual artefacts due to a block boundary on at least one side of the block boundary is modified according to the block type of at least one block in the environment of the block boundary (30).

23. A device according to Claim 22, **characterised** in that the filter is arranged such that at least one parameter of the filtering performed to reduce visual artefacts due to a block boundary is modified according to the block type of a first block and a second block, the first and second block being located on opposite sides of the block boundary (30).

24. A device according to Claim 22, **characterised** in that said at least one parameter is selected from a group comprising: a number of pixels to be examined, a number of pixels to be filtered, an activity measure providing an indication of the difference between pixel values on one side of the block boundary, a filtering window.

25. A device according to Claim 21, **characterized** in that it comprises means (42) that operate adaptively according to the image content of the frame, for selecting a number of pixels (n) for examination, and that means (42) for selecting a number of pixels (n) for examination comprises further means (42) for examining the block type of a block in the environment of the block boundary (30).

26. A device according to Claim 25, **characterised** in that it comprises means (42) for selecting the number of pixels (n) for examination depending on the difference in pixel value (Δ) between pixels across the block boundary.

27. A device according to Claim 19, **characterized** in that it comprises means (42) for selecting a number of pixels (n) for examination depending on the size of the quantization step (QP) of the coefficients used in the coding of the blocks.

28. A device according to Claim 27, **characterized** in that the means (42) for selecting the number of pixels (n) for examination comprises means (35) for determining said number of pixels according to the formula:

$$n = \begin{cases} 0 & \Delta \geq 2.00\alpha \\ 1 & 1.50\alpha \leq \Delta < 2.00\alpha \\ 2 & 1.00\alpha \leq \Delta < 1.50\alpha \\ 3 & 0.66\alpha \leq \Delta < 1.00\alpha \\ 4 & 0.40\alpha \leq \Delta < 0.66\alpha \\ 5 & 0.25\alpha \leq \Delta < 0.40\alpha \\ 6 & 0 \leq \Delta < 0.25\alpha \end{cases}, \qquad (2)$$

wherein Δis the difference in value between pixels across the block boundary, α = QP·log(QP) and QP is the size of the quantization step of the coefficients used in the coding of the blocks.

29. A device according to Claim 19, **characterized** in that it comprises means (42) for truncating the number of pixels (n) selected for examination on the basis of the block type of a block in the environment of the block boundary.

30. A device according to Claim 19, **characterized** in that the means (42) for selecting a number of pixels for examination comprises means for defining the number of pixels (n) according to the image content of the frame in the environment of the block boundary (30), and means for truncating the number of pixels (n) according to the block type of a block in the environment of the block boundary (30).

31. A device according to Claim 30, **characterized** in that the means for truncating the number of pixels (n) comprises means for selecting a truncation value (trval) according to the table:

Type of the Block on the First side	Type of the Block on the Second side							
	INTRA		COPY		CODED		NOT_CODED	
INTRA	n	n	2	2	n	4	n	2
COPY	2	2	2	2	2	4	2	2
CODED	4	n	4	2	4	4	4	2
NOT_CODED	2	n	2	2	2	4	2	2

and using said selected truncation value (trval) with the formula:

$$n_{tr} = \min(\text{trval}, n), \qquad (3).$$

32. A device according to Claim 19, **characterized** in that it comprises means (42) for selecting certain pixels to be filtered , means (42) for defining a filtering window, and means for determining a new value for each pixel to be filtered on the basis of pixels that appear in a filtering window set around the pixel.

33. A device according to Claim 32, **characterized** in that the means for determining a new value for each pixel comprises means for calculating a mean value of the pixels that appear in the filtering window.

34. A device according to Claim 28, **characterized** in that the means for determining a new value for each pixel comprises means for using said filtering window for the pixels to be filtered on the first side of the

block boundary, and means for determining the size of the window according to the table

d_r ($d_l > 1$)	r_1	r_2	r_3
1	X	X	X
2	1	X	X
3	1	1*	X
4	2	2	X
5	2	2	2**
6	3 or 2***	3	3

where

* the filtered value of pixel r_1 is used for filtering of pixel r_2

** the filtered values of pixels r_1 and r_2 are used for filtering pixel r_3

*** 3 if $d_l > 2$, otherwise 2,

wherein an integer parameter d_r indicates activity on the first side of the block boundary, and an integer parameter d_l indicates activity on the second side of the block boundary, r_1, r_2 and r_3 are the three pixels on the first side of the block boundary closest to the boundary in this order, X means that the pixel is not filtered, the number means that in addition to the pixel to be filtered, a quantity of pixels shown by the number are taken to the filtering window from both sides of the pixel to be filtered, and "3 or 2" means "3, if $d_l > 2$, otherwise 2", and means for using a filtering window defined similarly for determining the new value of the pixels to be filtered on the other side of the block boundary, with the exception that all r's are replaced by l's and vice versa.

35. A device according to Claim 34, **characterized** in that

$d_r = 6$, if $|r_1 - r_j| \leq \beta/j$ with all $j \in [1,6]$,
otherwise: $d_r = i$, where i meet the conditions
$i \in [1,n_{tr}]$,
$|r_1 - r_{i+1}| > \beta/i$, and
$|r_1 - r_j| \leq \beta/j$ with all $j \in [1,i]$,

wherein the auxiliary parameter $\beta = 4 \cdot \log(QP)$ and QP is the size of the quantization step of the transformation coefficients used in transformation coding of the blocks, and the value of the parameter d_i being determined similarly, with the exception that all r's are replaced by l's.

36. A device according to Claim 19, **characterized** in that it comprises programmable means (42) for selecting pixels from a saved frame as the pixels to be examined, programmable means (45) for selecting pixels to be filtered from among the pixels to be examined, and programmable means (44) for determining the new value of the pixels to be filtered.

37. A video encoder (10) comprising means (35—44) for coding and means for decoding a digital video signal by blocks, a block type being defined according to the coding method for a block selected according to a predetermined set of coding types, which encoder comprises a filter for reducing visual artefacts due to a block boundary, **characterized** in that the filter is arranged to operate adaptively according to the block types of the frame in the environment of the block boundary (30).

38. A video decoder (20) comprising means (35—44) for reducing visual artefacts in a frame of a digital video signal, which is coded by blocks and then decoded, a block type being defined according to the coding method for a block selected according to a predetermined set of coding types, which video decoder comprises a filter for reducing visual artefacts due to a block boundary, **characterized** in that the filter is arranged to operate adaptively according to the block types of the frame in the environment of the block boundary (30).

39. A video codec (10, 20) comprising means (35—44) for coding and decoding a digital video signal by blocks, a block type being defined according to the coding method for a block selected according to a predetermined set of coding types, which video codec comprises a filter for reducing visual artefacts due to a block boundary, **characterized** in that the filter is arranged to operate adaptively according to the the block types of the frame in the environment of the block boundary (30).

40. A mobile terminal (46) comprising a video codec (10, 20), which comprises means (35—44) for coding and decoding a digital video signal by blocks, a block type being defined according to the coding method for a block selected according to a predetermined set of coding types, which video codec comprises a filter for reducing visual artefacts due to a block boundary, **characterized** in that the filter is arranged to operate adaptively according to the the block types of the frame in the environment of the block boundary (30).

41. A storage medium for storing a software program comprising machine executable steps for coding and decoding a digital video signal by blocks, a block type being defined according to the coding method for a block selected according to a predetermined set of coding types, for reducing visual artefacts due to a block boundary by filtering, **characterized** in that the software program further comprises machine executable steps for filtering adaptively according to the the block types of the frame in the environment of the block boundary (30).